REMARKS

Amendments to the claims

The applicant has amended claim 1 in order to correct punctuation used throughout the claim. No new matter has been added by way of the amendments to the claim.

35 U.S.C.§103

Claims 1-20 have been rejected under 35 U.S.C.§103(a) as being unpatentable over Sirén (US 4, 777,134 – hereinafter Sirén), in view of Sirén (US 4,797,390 – hereinafter Sirén 2) and further in view of Vanderbeke et al (US 5,554,399).

The applicant is seeking to separate inositol from plant material. As inositol has very similar characteristics to the other neutral sugars that are present in high concentrations in a slurry of plant materials, separation can be very challenging. The core of the invention is to utilize a method for the partial hydrolysis of the phytate in a starting plant material to charge inositol phosphate intermediates, separate these intermediates from the neutral sugars in solution such as glucose, fructose and sucrose, and then complete the full hydrolysis of the intermediates. The last step is then to separate the neutral inositol from the charged ions and compounds.

At pages 3 and 4 of her Report, the Examiner cites Sirén against the present invention on the basis of Example 12.

Example 12 of Sirén teaches the hydrolysis of sodium phytate with wheat bran and the fractionation of a mixture of inositolphosphates. The Example uses a starting material that is purified sodium phytate (sourced from Sigma Chemical). Given the source is purified, the starting material does not contain any of the neutral soluble sugars found in the starting material of the present invention, such as fructose, glucose and sucrose.

In an initial step of Example 12, the sodium phytate is dissolved in the sodium acetate buffer at pH 5.0. In a next step the temperature is increased and the wheat bran is added to the slurry. The Examiner argues that wheat bran is a plant material containing a mixture of neutral sugars with a phytase enzyme and thus comprises an aqueous slurry thereof.

The applicant respectfully disagrees that wheat bran contains a mixture of neutral sugars. A person of ordinary skill in the art would know that wheat bran is a by product of the wheat milling industry and that the bran is the hard outer layer of the grain and thus consists primarily of fiber. Wheat bran contains almost zero sugars and thus by adding wheat bran as the source of enzyme to the sodium phytate, one is not adding any significant amounts of sugar, *if any*, to the slurry (see for instance the "USDA National Nutrient Database for Standard Reference, Release 22 (2009)", a copy of which is attached for the Examiner's reference).

In yet a further step in Example 12, after partial hydrolysis, the resulting supernatant is passed through a column and eluted with increasing concentrations of HCl in order to displace the inositol phosphates. Eluted fractions are then hydrolyzed for the purpose of identifying the various inositol phosphates. However, the mixture that is passed through the column is simply a mixture of inositol phosphates without the neutral sugars. As such, Sirén is merely measuring the various forms of inositol phosphates in order to quantify them and detect IP_3.

When contrasted with claim 1 of the present invention, step (a) is not taught since there is no treatment of an aqueous slurry of plant material containing a mixture of neutral sugars. The wheat bran is not the starting material that is the subject of the "treatment" or partial hydrolysis as per claim 1(a). Rather the starting material is sodium phytate which is not a plant material that contains any neutral sugars. Moreover, the addition of wheat bran to the purified sodium is being added merely for its phytase activity and is not likely to add any sugars to the mixture.

Step (c) is not present since Example 12 does not separate the water soluble fraction into a first ionic fraction from another neutral fraction which contains neutral sugars. Furthermore, step (e) of claim 1 is not taught in Sirén since the step of isolating the inositol from the other charged components is not disclosed.

The Examiner has further cited Sirén 2 at page 4 of her Report on the basis that phytase enzyme is normally present in all inositol containing plants and seeds and is therefore not necessary to add enzyme if a natural product is used as a starting material Applicant notes that Sirén 2 teaches adding a phytase enzyme to a mixture of higher inositol phosphates to break them down to IP_3. However, Sirén 2 does not teach the present invention, and also does not teach steps (c) and (e) taught by claim 1 of the present invention that are missing from Sirén. Applicant also submits that using the phytase enzyme that is normally present in all inositol phosphate containing plants is not always feasible, especially in cases where the starting material has little to no naturally occurring phytase activity.

The core of the present invention is to utilize a method for the partial hydrolysis of phytate to charge intermediates, separate these negatively charged intermediates from the neutral sugars in solution and then complete the hydrolysis to generate neutral inositol that can be readily separated from charged ions and compounds using known charged based separation techniques. The elements of claim 1 and dependent claims 2-20 are not taught or disclosed by Sirén or Sirén 2 individually, nor by the combination of Sirén and Sirén 2.

The Examiner has further cited Vanderbeke at page 5 of her Report against the present invention. However, Vanderbeke merely teaches that full hydrolysis is possible with an optimized enzyme composition that displays a higher synergistic phytate hydrolyzing activity at a pH from 2.5 to 5.0 and an acid phosphatase having phytate hydrolyzing activity at a pH of 2.5. Vanderbeke in and of itself does not teach the steps disclosed in claim 1 of the present invention nor what is missing from Sirén and Sirén 2.

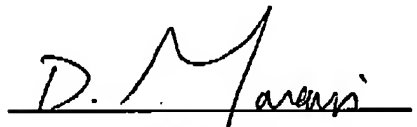
For the foregoing reasons, it is submitted that the references alone or in combination do not teach what is claimed in the present invention and it would not have been obvious for one of ordinary skill in the art at the time the invention was made to combine Sirén, Sirén 2, and Vanderbeke to arrive at the present invention.

The Examiner is respectfully requested to reconsider and withdraw the rejections of claims 1-20 under 35 U.S.C. §103(a), as being unpatentable over Sirén, in view of Sirén 2, further in view of Vanderbeke et al.

Summary

In view of the foregoing, Applicant respectfully submits that all pending claims are clearly and patentably distinguished over the references cited by the Examiner and, as such, are in condition for allowance.

Respectfully submitted,



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Wheat bran, crude

New Search

Refuse: 0%
NDB No: 20077 (Nutrient values and weights are for edible portion)

Nutrient	Units	Value per 100 grams	Number of Data Points	Std. Error
Proximates				
Water	g	9.89	15	0.680
Energy	kcal	216	0	
Energy	kJ	904	0	
Protein	g	15.55	13	0.523
Total lipid (fat)	g	4.25	11	0.211
Ash	g	5.79	13	0.246
Carbohydrate, by difference	g	64.51	0	
Fiber, total dietary	g	42.8	0	
Sugars, total	g	0.41	0	
Minerals				
Calcium, Ca	mg	73	4	7.008
Iron, Fe	mg	10.57	5	1.200
Magnesium, Mg	mg	611	4	75.506
Phosphorus, P	mg	1013	3	92.602
Potassium, K	mg	1182	4	123.940
Sodium, Na	mg	2	4	0.855
Zinc, Zn	mg	7.27	4	0.632
Copper, Cu	mg	0.998	4	0.112
Manganese, Mn	mg	11.500	4	6.184
Selenium, Se	mcg	77.6	2	
Vitamins				
Vitamin C, total ascorbic acid	mg	0.0	0	
Thiamin	mg	0.523	4	0.052
Riboflavin	mg	0.577	3	0.064
Niacin	mg	13.578	5	4.398
Pantothenic acid	mg	2.181	4	0.478
Vitamin B-6	mg	1.303	5	0.328
Folate, total	mcg	79	4	13.385
Folic acid	mcg	0	0	

Folate, food	mcg	79	4	13.385
Folate, DFE	mcg_DFE	79	0	
Choline, total	mg	74.4	0	
Vitamin B-12	mcg	0.00	0	
Vitamin B-12, added	mcg	0.00	0	
Vitamin A, RAE	mcg_RAE	0	1	
Retinol	mcg	0	0	
Carotene, beta	mcg	6	1	
Carotene, alpha	mcg	0	0	
Cryptoxanthin, beta	mcg	0	0	
Vitamin A, IU	IU	9	1	
Lycopene	mcg	0	0	
Lutein + zeaxanthin	mcg	240	1	
Vitamin E (alpha-tocopherol)	mg	1.49	0	
Vitamin E, added	mg	0.00	0	
Vitamin D (D2 + D3)	mcg	0.0	0	
Vitamin D	IU	0	0	
Vitamin K (phylloquinone)	mcg	1.9	0	
Lipids				
Fatty acids, total saturated	g	0.630	0	
4:0	g	0.000	0	
6:0	g	0.000	0	
8:0	g	0.000	0	
10:0	g	0.000	0	
12:0	g	0.002	8	
14:0	g	0.007	8	
16:0	g	0.556	8	
18:0	g	0.037	8	
Fatty acids, total monounsaturated	g	0.637	0	
16:1 undifferentiated	g	0.017	8	
18:1 undifferentiated	g	0.619	8	
20:1	g	0.000	0	
22:1 undifferentiated	g	0.000	0	
Fatty acids, total polyunsaturated	g	2.212	0	
18:2 undifferentiated	g	2.039	8	
18:3 undifferentiated	g	0.167	8	
18:4	g	0.000	0	

20:4 undifferentiated	g	0.005	8	
20:5 n-3 (EPA)	g	0.000	0	
22:5 n-3 (DPA)	g	0.000	0	
22:6 n-3 (DHA)	g	0.000	0	
Cholesterol	mg	0	0	
Amino acids				
Tryptophan	g	0.282	2	
Threonine	g	0.500	12	
Isoleucine	g	0.486	12	
Leucine	g	0.928	12	
Lysine	g	0.600	12	
Methionine	g	0.234	12	
Cystine	g	0.371	12	
Phenylalanine	g	0.595	12	
Tyrosine	g	0.436	12	
Valine	g	0.726	12	
Arginine	g	1.087	12	
Histidine	g	0.430	12	
Alanine	g	0.765	12	
Aspartic acid	g	1.130	12	
Glutamic acid	g	2.874	12	
Glycine	g	0.898	12	
Proline	g	0.882	12	
Serine	g	0.684	12	
Other				
Alcohol, ethyl	g	0.0	0	
Caffeine	mg	0	0	
Theobromine	mg	0	0	

USDA National Nutrient Database for Standard Reference, Release 22 (2009)

New Search